

GMFC-0032  
(GP-300032)

**CARBON MONOXIDE ADSORPTION FOR CARBON  
MONOXIDE CLEAN-UP IN A FUEL CELL SYSTEM**

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ABSTRACT OF THE DISCLOSURE

10 An apparatus removes carbon monoxide (CO) from a hydrogen-rich  
gas stream in a hydrogen fuel cell system. CO fouls costly catalytic particles in the  
membrane electrode assemblies of proton exchange membrane (PEM) fuel cells. A  
vessel houses a carbon monoxide adsorbent. The vessel may be a rotating pressure  
swing adsorber. A water gas shift reactor is upstream of the rotating pressure swing  
15 adsorber. The water gas shift reactor may include a second adsorbent adapted to  
adsorb carbon monoxide at low temperatures and to desorb carbon monoxide at high  
temperatures. The apparatus advantageously eliminates the use of a preferential  
oxidation (PROX) reactor, by providing an apparatus which incorporates CO  
adsorption in the place of the PROX reactor. This cleans up carbon monoxide  
without hydrogen consumption and the concomitant, undesirable excess low grade  
heat generation. The present invention reduces start-up duration, and improves  
overall fuel processor efficiency during normal operation.

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